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समाचार पत्रों से चयित अंश Newspapers Clippings

A Daily service to keep DRDO Fraternity abreast with DRDO Technologies, Defence Technologies, Defence Policies, International Relations and Science & Technology

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COVID 19: DRDO's Contribution*Sun, 18 April 2021*

दिल्ली में नया कोविड अस्पताल कल से शुरू होगा, इलाज और सुविधाएं मुफ्त होंगी: डीआरडीओ चीफ

डीआरडीओ चीफ डॉ जी सतीश रेड्डी से NDTV की बातचीत, लखनऊ

में भी 500 से 600 बेड का कोविड हॉस्पिटल शुरू किया जाएगा

Reported by राजीव रंजन, Edited by सूर्यकांत पाठक

नई दिल्ली: कोरोना वायरस संक्रमण बहुत बढ़ रहा है। यह दुर्भाग्यपूर्ण हालात हैं, इसलिए सब एहतियात बरतें। मास्क का इस्तेमाल करें। वैक्सीन अधिक लगानी है। इसे मैक्सिम करने के लिए सरकार

बहुत कोशिश कर रही है। इसके लिए डीआरडीओ (DRDO) काफी काम कर रहा है। डीआरडीओ चीफ डॉ जी सतीश रेड्डी (Dr G Satheesh Reddy) ने NDTV से चर्चा में यह बात कही। उन्होंने बताया कि "डीआरडीओ का दिल्ली में कोविड हॉस्पिटल (COVID Hospital) कल से शुरू हो जाएगा। यह 6-7 दिन में बना है। इसमें 500 आईसीयू बेड की सुविधा है। इसमें इलाज के लिए किसी से एक रुपया तक नहीं लिया जाएगा। ऑक्सीजन से लेकर वेंटिलेटर तक, सब फाइव स्टार की सुविधा होगी। इस कोविड हॉस्पिटल में हर तरह की सुविधा है। जांच की भी सुविधा है। ऐसा हॉस्पिटल देश भर में कहीं नहीं है। खाना और टॉवल तक सब फ्री है।"



कोरोना से निपटने में कैसे योगदान दे रहा है DRDO, बता रहे हैं संगठन के प्रमुख

उन्होंने कहा कि "गुजरात में 900 बेड का अस्पताल 24 अप्रैल तक तैयार हो जाएगा। पटना में हॉस्पिटल ऑपरेशनल हो गया है। लखनऊ में भी 500 से 600 बेड का कोविड हॉस्पिटल शुरू किया जा रहा है।"

रेड्डी ने कहा कि "किसी ने ऐसा सोचा नहीं कि हालात इतने खराब हो जाएंगे। कोविड से लड़ने के लिए हॉस्पिटल में बेड और ऑक्सीजन चाहिए। हमने एक बोर्ड भी बनाया है। अस्पताल में प्लांट बनाया है। यह कई जगह लगा रहे हैं। मास्क, सैनेटाइजर सब इंडस्ट्री को तकनीक दे रहे हैं। टेस्टिंग सुविधा दे रहे हैं। अगले तीन-चार दिन में सब तैयार हो जाएगा। देश में 50000 वेंटिलेटर हैं, और जरूरत होगी तो रेडी हो जाएंगे। ऑक्सीजन का दिक्कत भी 5-6 दिन में सॉल्व हो जाएगी।"

उन्होंने कहा कि "डीआरडीओ केवल तकनीक दे रहा है। राज्य सरकारों को मदद दे रहा है। वेंटिलेटर, ऑक्सीजन प्लांट, टेस्टिंग प्लांट बना रहा है। सैनेटाइजेशन का काम कर रहा है। सेना के डॉक्टर काफी मदद कर रहे हैं। कोविड के दौरान डीआरडीओ लैब में क्वारंटाइन सेंटर बनाया है।"

डीआरडीओ के प्रमुख ने कहा कि "सब लोग एहतियात बरतें। मास्क हमेशा पहनें, फंक्शनों में जाने से बचें। डरने की जरूरत नहीं है। वेंटिलेटर देश में उपलब्ध है, जो भी चाहिए सब बन रहा है। जिसको जरूरत है उनको बेड मिलेगा।"

<https://ndtv.in/india-news/coronavirus-new-covid-hospital-in-delhi-to-start-from-tomorrow-treatment-and-facilities-will-be-free-drdo-chief-2415847>

The Indian EXPRESS

Mon, 19 April 2021

Delhi DRDO Covid facility that was shut during lull to open again

The facility had been opened in July last year when the city saw a shortage of ICU beds, and had the capacity to admit 1,000 patients. On Monday, it is expected to restart with 250 ICU-ventilator beds, DRDO officials said.

By Ananya Tiwari

Shut two months ago, the Sardar Vallabhbhai Patel Covid hospital constructed by the Defence R&D Organisation (DRDO) near Dhaula Kuan in Delhi will reopen for Covid patients on Monday.

The facility had been opened in July last year when the city saw a shortage of ICU beds, and had the capacity to admit 1,000 patients. On Monday, it is expected to restart with 250 ICU-ventilator beds, DRDO officials said.



Defence personnel prepare the 500 bedded DRDO Covid Care centre in New Delhi on Sunday.
Express Photo by Abhinav Saha

Over the past two weeks, Delhi has seen record surges in Covid cases. Close to 25,500 new cases were detected on Sunday, the most for any Indian city so far. Chief Minister Arvind Kejriwal said hospitals were running out of beds and oxygen, and appealed to the Centre for help.

The DRDO facility wound up operations a little over a month before the present crisis – which the Delhi government has called the “fourth wave” – hit the national capital. Before it shut on February 18, the facility had six-seven patients, and it closed its doors by orders of the Ministry of Home Affairs after they were discharged.

All four hangars where the temporary wards were set up were fully dismantled, equipment was sent back to where they had come from, and beds were removed. Only one bare hangar and a main tent that served as the entrance and lobby area, remained.

The temporary facility had come up when Delhi was seeing around 2,500 cases a day – a tenth of the numbers now. The four hangars were made of prefabricated material and had 1,000 beds, of which 250 were ICU beds, which came up in 12 days.

When Delhi reached its previous peak in November, of around 8,500 cases a day, the temporary hospital also saw its highest patient load of 552 patients.

When the decision to shut the centre was taken in February, states such as Maharashtra and Punjab were already seeing a fresh surge. On February 18, Maharashtra reported 5,427 cases, crossing the 5,000 mark for the first time after dropping below 2,000. Mumbai alone saw 736 cases after previously dropping below 400.

When [The Indian Express](#) visited the facility on Sunday, one hangar had been set up again, with 250 beds and healthcare staff from the Armed Forces Medical Services present at the site.

Another hangar was under construction to accommodate 250 more beds; it was expected to be ready to admit patients in the coming week. The prefabricated frames are made of aluminium alloy, and the sheet is a fire-resistant poly-elastic material. The frames require assembling.

“We shall start with 250 beds for now from Monday, and the infrastructure is complete for it. It has oxygen support and ventilators, and the hangar is fully equipped with centralised air conditioning, a basic lab, and a pharmacy,” Dr K Radhakrishnan, chief construction engineer (R&D), DRDO, said. Construction of another hangar was underway, he said.

“A team of the AFMS, led by Additional DGAFMS Major General S S Bhatia, will take over from Sunday and patients are likely to be taken in from Monday. Two doctors are from the Central Reserve Police Force (CRPF) also,” he said.

The DRDO site is not the only one that was dismantled and is now being set up again. The Delhi government had shut down the 500-bed Covid care centre at the Commonwealth Games Village as well, as very few people were reporting to it. That centre is now being restarted as well.

The ITBP-run centre at the Radha Soami Satsang grounds in Chhatarpur was also shut in February, and is now being readied for patients again.

<https://indianexpress.com/article/india/delhi-drdo-covid-facility-that-was-shut-during-lull-to-open-again-7279436/>

Sun, 18 April 2021

Super facility arrangements by DRDO to help the COVID patients in Delhi-NCR

By Huma Siddiqui

In view of the growing number of COVID-19 patients in Delhi-NCR, once again Defence Research and Development Organisation (DRDO) on Monday is going to reopen a 500 bed hospital located near the New Delhi Domestic Airport Terminal T1. Confirming this to Financial Express Online, Narendra Arya, official spokesperson of DRDO on Saturday said, “This facility will come up at the same place as it was last year. In February this was shut down, however, by Monday 250 beds will be ready and the balance 250 beds will be ready soon.” Let us take a look at some of the other images and key features of super facility arrangements by DRDO:



Who can avail this facility & what is required for admission?

Anyone who has RTPCR Covid positive report. An Aadhar card will be necessary. This is absolutely free.

What treatment is available? Will there be ventilators & Oxygen?

Yes! According to the official spokesperson at the facility which has been set up by DRDO, there will be a medical team led by Director General Armed Forces Medical Services (DGAFMS).

“There will be a large number of monitoring equipment, ventilators, basic testing facilities, and air-conditioning as per the WHO standards,” Mr Arya told Financial Express Online.

And, “in case of the neuro or cardiac cases, these will be referred to the Delhi based All India Institute of Medical Sciences,” he added late Saturday evening.

According to him, the facility will be commanded by Major General SS Bhatia of the Army Medical Corps and there will be a medical team of DGAFMS and as well as doctors from Central Armed Police Forces who all will report to him.

Whether there will be wards and ICU named after fallen soldiers like the last time is not known.

As has been reported by Financial Express Online in July last year, DRDO had set up the 1,000-bed medical facility at the same location (Indian Air Force land) which was earlier this year shut down when the number of COVID-19 positive cases had come down.

The medical facility spread over 25,000 square metres had come up in a short span of 14 days last summer in which DRDO was the nodal agency and had undertaken the design, development as well as the operationalization of the facility on a war footing.

In the previous facility there was an ICU hangar which was named after Col B Santosh Babu who had lost his life along with 19 others in the clash with Chinese soldiers in Galwan, Ladakh. And there were other general wards which were named after other fallen soldiers including – Shaheed Nb Sub Satnam Singh Medical Ward, Shaheed Nb Sub Nuduram Soren and Shaheed Nb Sub Mandeep Singh Medical Ward.

Meanwhile...

Defence minister Rajnath Singh has directed DRDO to help set up the facility in his constituency. For this project, according to reports, the Defence Expo-2020 site at Vrindavan Yojana next to Shaheed Path, has been identified.

The Haj House on Kanpur Road and Golden Blossom Resort on Faizabad Road are going to be converted into makeshift Covid hospitals with the DRDO's help.

And the DRDO is also expected to set up three temporary hospitals – adding almost 1500-2000 beds to deal with the growing number of cases. Also, to provide health services, the Army Central Command was also being contacted.

<https://www.financialexpress.com/photos/business-gallery/2235373/super-facility-arrangements-by-drdo-to-help-the-covid-patients-in-delhi-ncr-see-photos/3/>

Business Standard

Sat, 17 April 2021

MHA asks CAPFs to depute 25 doctors, 75 paramedics at DRDO's Covid hospital

Gujarat reported 8,920 fresh coronavirus cases on Friday, taking the state's tally to 3,84,688, while a record 94 patients died due to the infection

New Delhi: Ministry of Home Affairs on Friday decided to depute 25 medical officers and 75 paramedics at the upcoming 900 bedded DRDO's COVID hospital in Ahmedabad.

In Delhi as well, Home Ministry has deputed the same number of staff for DRDO's COVID care in Delhi Cantonment, which will be reactivating soon.

According to a communication, the Home Ministry has said, "The Chief Secretary, Gujarat has informed that DRDO is establishing a 900 bed hospital for COVID patients at the Gujarat University Convention Centre, Ahmedabad and has requested for deputing medical officers and other paramedical staff to help run the hospital."

"It has been decided to depute 25 medical officers and 75 paramedical staff from CAPFs," the MHA said while asking forces to spare certain amount of doctors and paramedics from all paramilitary forces.

The MHA has asked forces "to identify force-wise medical officers and paramedics to be deputed to the DRDO Hospital and they have to report for duty at DRDO Hospital Ahmedabad by April 21."

Earlier, the MHA had asked forces to send 25 medical officers and 75 paramedics for Delhi Cantonment DRDO's COVID-19 care centre, which will start operating soon.

The decision for re-activation of the COVID centre was taken in a meeting under the chairmanship of Union Home Secretary Ajay Bhalla.

Currently, the Centre in Delhi Cantonment will have 250 ICU-bedded facilities which will be increased up to 500 in the next few days.

(Only the headline and picture of this report may have been reworked by the Business Standard staff; the rest of the content is auto-generated from a syndicated feed.)

https://www.business-standard.com/article/current-affairs/mha-asks-capfs-to-depute-25-doctors-75-paramedics-at-drdo-s-covid-hospital-121041700303_1.html



Home Minister Amit Shah greets as he arrives to attend Budget Session of Parliament, in New Delhi on Friday.

DRDO setting up hosp in Ahmedabad for Covid patients

By Rakesh K Singh

The Centre has conveyed to the Gujarat Government that DRDO is establishing a 900-bedded hospital in Ahmedabad to cater to the “alarming surge” in Covid-19 cases there.

The Union Home Ministry has also directed the Central Armed Police Forces (CAPFs) or the Central paramilitary forces to spare 25 doctors and 75 paramedics and ensure that they report by April 21 to man the hospital in Gujarat.

“The hospital is being established at the Gujarat University Convention Centre, Ahmedabad to cater to the alarming surge of the Covid cases there,” reads an order issued by Additional Director General (Medical) of CAPFs under the Union Home Ministry on Friday.

It has further been decided and conveyed that CAPFs are required to provide 25 medical officers and 75 paramedical/nursing staff, reads the order.

“It is, therefore, requested that the following number of doctors and paramedics/nursing staff be detailed for the purpose please,” it said.

The detailed staff should report to the nodal officer (Colonel B Chaubey, DRDO Hospital, Ahmedabad by April 21 positively, it said.

Through the order, the ADG (Medical), CAPFs, Dr Mukesh Saxena has also named Devarshi Raval as the nodal officer for making logistical arrangements at Gujarat University.

The letter has been circulated to Inspector General (Medical) of the Border Security Force (BSF), Central Reserve Police Force (CRPF) and Sashastra Seema Bal (SSB).

The BSF will send 10 doctors and 30 paramedics, the CRPF will spare 10 doctors and 25 nursing staff and SSB to chip in with five doctors and 20 paramedical personnel for the DRDO hospital in Ahmedabad.

Through the communication to the heads of CRPF, BSF and SSB, the Ministry has asked them to send their team on priority and the doctors and paramedics have to report to the nodal officer of the said hospital latest by April 21.

The Defence Research and Development Organisation (DRDO) hospital set to be operationalised by late next week, officials said.

On Friday, the Defence Minister Rajnath Singh directed the DRDO to reopen the Sardar Vallabh Bhai Patel Covid care hospital here which was set up in July last year. He has also asked the defence body to set up a new facility in Lucknow.

<https://www.dailypioneer.com/2021/india/drdo-setting-up-hosp-in-ahmedabad-for-covid-patients.html>

DRDO takes over Awadh Shilpgram to build 300-bed makeshift Covid hospital

By Yusra Husain

Lucknow: Defence Research and Development Organisation (DRDO) on Sunday took over Awadh Shilpgram on Shaheed Path to set up a makeshift hospital for Covid-19 patients in the city.

DRDO is also expected to set up two more makeshift Covid hospitals at Haj House and Golden Blossoms resort on Faizabad road.

Lucknow district administration handed over Awadh Shilpgram compound to DRDO where a 300-bed hospital is expected to come up this week. The initiative came after Union defence minister and Lucknow MP Rajnath Singh stepped in to cater to the rising demand of beds in view of soaring Covid-19 cases in the city.

An order by Lucknow's officiating district magistrate Roshan Jacob said all infrastructural amenities at Awadh Shilpgram, including furniture, electricity and water services be handed over to DRDO with immediate effect.

Lok Sabha representative of Lucknow MP Rajnath Singh, Diwakar Tripathi, said: "DRDO has started building Covid hospital in Lucknow at Awadh Shilpgram site on mission mode. The hospital will have a combination of oxygen enabled beds and ICU facilities. Hospital layout designs have been completed and preliminary implementation activities have started in various halls of Awadh Shilpgram. It is expected that dry run checks for testing of various advanced medical facilities will start soon." TOI had earlier reported that the makeshift hospitals will be provided with an oxygen plant based on the mechanism currently used for fighter pilots of Light Combat Aircraft (LCA) Tejas. The technology developed for the aircraft breaks down molecules of atmospheric oxygen making the system self-sustainable in oxygen production.

This plant can provide medical grade oxygen at a high flow rate catering to at least 50 ventilator ICU beds round the clock.

<https://timesofindia.indiatimes.com/city/lucknow/drdo-takes-over-awadh-shilpgram-to-build-300-bed-makeshift-covid-hospital/articleshow/82135054.cms>

How DRDO's LCA Tejas technology comes in handy to treat india's Covid-19 patients

India's premier defense research body DRDO will produce oxygen with a technology used on the LCA Tejas fighter to treat COVID-19 patients, according to reports. There has been a nationwide oxygen shortage due to the sudden spike in Coronavirus cases.

The Times of India reported that the Defence Research and Development Organisation (DRDO) would ensure oxygen supply to the makeshift hospitals being set up in Uttar Pradesh's capital Lucknow to accommodate the rising number of COVID-19 patients.

This self-sustainable oxygen generation technology has been used by the research body for IAF pilots flying the LCA Tejas and is called Onboard Oxygen Generation System (OBOGS).

This technology is used in fighter jet cockpits to compensate for the rapid decrease in oxygen levels at high altitudes. According to DRDO, the OBOGS replaces the traditional Liquid Oxygen System (LOX) by utilizing bleed air or the compressed air from the aircraft engine and separating its components using molecular sieve (Zeolite) Pressure Swing Adsorption (PSA) technology.



File Image: LCA Tejas

The system consists of two molecular sieve beds with an oxygen plenum to provide the aircrew with breathing gas continuously.

Officials told the daily that the DRDO plant can provide medical-grade oxygen round-the-clock at a high flow rate catering to at least 50 ventilator ICU beds. This technology will be used to activate oxygen plants at COVID hospitals as well.

This technology has been developed by DRDO's Defense Electromedical & Bio-Engineering Laboratory, a specialized wing focussed on technologies and products in the areas of life support, medical and physiological protection systems for the Indian Armed Forces.

The Tejas technology would be used to provide a continuous supply of oxygen to COVID beds, and refiling used cylinders. This would address the problem of oxygen shortage the country is facing, with the number of Covid cases making new records on a daily basis.

<https://eurasianimes.com/how-drds-lca-tejas-technology-comes-in-handy-to-treat-indias-covid-19-patients/>

DRDO hospitals to start in Lucknow after Rajnath's intervention, to harness Tejas tech for oxygen

Rajnath Singh is in constant touch with UP CM Yogi Adityanath over the serious situation in Lucknow which has nearly 45,000 active cases presently

New Delhi: Two hospitals by the Defence Research and Development Organisation (DRDO) in Covid-struck Lucknow are set to be operational by next week after the intervention of Union Defence Minister Rajnath Singh. The hospital will feature a Medical Oxygen Plant for its own oxygen generation, similar to technology that has been developed for the Light Combat Aircraft, Tejas.

Rajnath Singh, who is also the Member of Parliament from Lucknow, is in constant touch with UP CM Yogi Adityanath over the serious situation in Lucknow which has nearly 45,000 active cases presently, and reported about 6,000 cases in the last 24 hours along with 36 deaths.



File photo of Defence Minister Rajnath Singh. (PTI)

Officials told News18 that the Defence Minister is most concerned that patients in need do get a hospital bed and the spread of the pandemic in the state capital is restricted by strict micro-containment measures in the Covid hotspots.

Singh had instructed DRDO on Friday to set up two hospitals with total of 600 beds in Lucknow in mission-mode to increase the bed capacity in the city and is constantly monitoring the progress. "UP government has acted quickly on Singh's initiative and both sites, the Haj House on Lucknow-Kanpur road and Golden Blossom Resort, have been identified and acquired. The capacity here will be expanded to 1000 beds soon and both facilities will be operational by the end of next week," an official told News18.

The DRDO will be setting up Medical Oxygen Plants at both these make-shift hospitals which will generate their own Oxygen which will be supplied to patients, eliminating the need for bringing in Oxygen cylinders from outside. This will be a big relief as oxygen shortages are being faced. This technology is inspired from Onboard Oxygen Generation system developed for the light combat aircraft Tejas which generates oxygen directly from atmospheric air. Once installed at the DRDO hospitals, this would reduce dependence on Oxygen cylinders from outside. DRDO is also set to reopen its facility in Delhi for Covid on Sunday.

The Yogi Adityanath government on Saturday also released Rs 225 crore package from the state disaster relief fund for fighting the second Covid wave and put this amount at the disposal of district magistrates for containment operations, medicines, PPE Kits, Oxygen Cylinders, Covid Testing Kits and Home Isolation kits. Districts facing bigger case load were given Rs 5 Cr each while other districts have been given Rs 2 Cr each for the purpose. This followed a Union Home Ministry letter to states two days ago.

<https://www.news18.com/news/india/drdo-hospitals-to-start-in-lucknow-after-rajnaths-intervention-to-harness-tejas-tech-for-oxygen-3651485.html>

DRDO to build three Covid hospitals in Lucknow; to add 2000 beds

By Vatsala Gaur

Synopsis

Additionally, a greenfield 1000-bed Covid facility requested by the UP CM will also be built with the help of DRDO from scratch, on the lines of the Sardar Patel Covid Care Centre brought up in Delhi last year. This is likely to come up on the venue at which the Defence Expo was held last year in Lucknow over the next 12-15 days.

With the covid situation in Lucknow turning grim, putting extreme pressure on bed availability, union minister of defence and member of parliament from Lucknow, Rajnath Singh has directed the Defence Research and Development Organisation (DRDO) to construct two makeshift hospitalisation facilities totalling about 600 beds for Covid patients on a war footing in the district.

Additionally, a greenfield 1000-bed Covid facility requested by the UP CM will also be built with the help of DRDO from scratch, on the lines of the Sardar Patel Covid Care Centre brought up in Delhi last year. This is likely to come up on the venue at which the Defence Expo was held last year in Lucknow over the next 12-15 days. A DRDO team had arrived in Lucknow on Friday for exploring the sites.

The two facilities will be made in Haj House and Golden Blossom Resort in Lucknow, according to an order passed by the district magistrate Abhishek Prakash and is expected be prepared within the next three days. The three facilities together will add 1,500-2000 beds in the districts that is seeing a sharp rise in daily cases.

Lucknow reported its highest ever 24 hour surge of 6,598 cases on Friday taking the current active case load of the city 40,753. \

Singh has been constantly in touch with the UP CM over the last few days, Diwakar Tipathi, Singh's Lok Sabha representative in Lucknow said.

Uttar Pradesh reported its highest ever tally- 27,426 cases on Friday, along with 103 deaths. The number of active cases in the state has reached 1.50 lakh, out of which more than half are in home isolation.

<https://economictimes.indiatimes.com/news/india/drdo-to-build-three-covid-hospitals-in-lucknow-to-add-2000-beds/articleshow/82113798.cms>



NetIndian

Sat, 17 April 2021

IAF's Light Combat Aircraft order to boost domestic defence industry: Rajnath

New Delhi: The Rs 48,000-crore order from the Indian Air Force (IAF) for 83 light combat aircraft (LCA) Tejas would substantially boost the domestic defence industry and promote self-reliance, Defence Minister Rajnath Singh said on Thursday.

Addressing the biannual IAF Commanders' Conference (AFCC-21) at the Air Headquarters, the Minister termed it as a game-changer from the indigenisation perspective. He urged the Commanders to continue their efforts for achieving even greater results in the field of indigenous defence production and aircraft maintenance.



Defence Minister Rajnath Singh addressing the IAF Commanders at the Air Force Commanders' Conference, in New Delhi on April 15, 2021.

National security and economic development are complementary aspects of national policy. The IAF's support for the indigenous industry would result in the development of MSMEs in this field which will simultaneously serve the cause of self-reliance and socio-economic development of the country.

Air Chief Marshal RKS Bhadauria, Chief of the Air Staff (CAS), welcomed the Defence Minister along with Gen Bipin Rawat, Chief of Defence Staff (CDS) and other senior officials from the Ministry.

Rajnath Singh expressed happiness that the conference coincided with the birth anniversary of the Marshal of the Air Force Arjan Singh.

He congratulated the IAF for ensuring a timely and befitting response to the sudden developments in Eastern Ladakh. He advised the Commanders to draw up long term plans and

strategies for capability enhancement to counter future threats. He appreciated the critical focus of IAF towards reorienting for the future.

Speaking about the ongoing COVID-19 pandemic, he lauded the role played by the IAF in assisting other Government agencies in this task.

Referring to the changing international geopolitics, he observed that the perceptible shift of focus from Trans-Atlantic to Trans-Pacific has become more obvious in the recent past. The changing dimensions of war would now include advanced technologies, asymmetric capabilities and info-dominance. The IAF's preparations for the future must take into account all these aspects.

He stressed the need to continue to work proactively towards the integration process currently underway, implementation of the joint logistics plan and enhance synergy in areas of joint planning and operations.

In his closing remarks, the Minister assured the AF Commanders of the wholehearted support from the Ministry of Defence in achieving the goal of being a potent Strategic Aerospace Force. He expressed confidence that important decisions taken during the conference would enhance the combat potential of the IAF.

The Commanders' Conference will conclude on April 16. The status of strengthening current combat capabilities and the action plan for making IAF a future-ready combat force would be examined. It will also take up Issues on systems, reforms and restructuring for ensuring more efficient processes across all domains besides optimised operational training, an official.

<https://www.netindian.in/news/national/defence/iafs-light-combat-aircraft-order-to-boost-domestic-defence-industry-rajnath>



Press Information Bureau
Government of India

Ministry of Defence

Fri, 16 April 2021 8:34PM

IAF Commanders' conference Apr 2021

The IAF Commanders' Conference 2021, themed 'Reorienting for the Future' concluded at Air HQs on 16 Apr 21. The three day conference saw detailed deliberations on ways and means to enhance the operational capabilities of the IAF.

Air Officers Commanding-in-Chief of the seven commands and key appointments from Air HQ attended the conference. The conference was addressed by the Hon'ble Raksha Mantri on 15 Apr 21. The CDS, CNS and COAS also addressed the conference and interacted with the commanders on subjects of future war-fighting through joint planning and integration of service capabilities.

The actions and follow-up plans for implementing the directions given by the Hon'ble PM during the Combined Commanders' Conference were discussed by the participants. The other key subjects included reorientation of the IAF for future challenges across all threat domains, and the roadmap for effective utilisation of assets and future inductions. The contours of the operational philosophy and organisational aspects of Air Defence and Joint Command Structures were also discussed.

In his address to the Commanders, the CAS emphasised the need for incorporation of new technologies such as AI and 5G, enhanced utilisation of cyber and space domains and continuous update of doctrines, tactics and procedures. He stressed upon empowerment of junior leadership through comprehensive HR reforms and increasing efficiency through organisational restructuring. He also highlighted the requirement for innovative and low cost solutions for enhancing training effectiveness as well as adopting a scalable contingency response model.

<https://www.pib.gov.in/PressReleasePage.aspx?PRID=1712343>

Indian armed forces to build 5G network: Defence Secretary

By Muntazir Abbas

Synopsis

In October last year, the US Department of Defence said it would spend \$600 million for 5G experiments and testing at a few military sites, after increased efforts by China to make 5G a reality in many defence applications following investments in AI, quantum computing and under-sea cables.

The Indian army, navy, and air force are likely to embrace the next generation (5G) technology to bring artificial intelligence (AI) and unmanned vehicles to centre stage in a bid to compete with the most advanced armed forces worldwide, according to a top official.

"Armed forces also will need to migrate to 5G network considering the use of unmanned vehicles and AI in future," Ajay Kumar, Secretary, Ministry of Defence told ET, adding that, "the ministry will take necessary steps to take forward 5G connectivity with relevant use cases."

Fifth-generation or 5G technology-driven telecom network is touted to bring low-latency communications to the mainstream with a range of enterprise-wide use cases across agriculture, manufacturing and retail verticals in addition to defence applications.

Kumar, however, added that the 5G is at a nascent stage in India yet, and no commercial deployment has taken so far in the country, while the Indian forces are keen to leverage futuristic technologies.

In October last year, the US Department of Defence said it would spend \$600 million for 5G experiments and testing at a few military sites, after increased efforts by China to make 5G a reality in many defence applications following investments in AI, quantum computing and under-sea cables.

Experts say that the move to adopt 5G technology and artificial intelligence would usher into entirely different use cases, and would eventually boost defence capabilities to pre-empt the enemy.

The country's defence-centric next-generation network would require new contiguous frequencies, and according to analysts, only highly efficient bands would make a suitable case for such a critical sector.

"A separate set of spectrum may be taken for defence applications and protocols may be required to be modified to suit the confidentiality of communications," Rakesh Malhotra, a Delhi-based telecom consultant said.

In 2018, the Telecom Regulatory Authority of India (Trai) had recommended 3300 -3600 megahertz band for the commercial 5G deployment in the country that included 100 megahertz held by the naval forces which have recently been vacated by the Ministry of Defence.

"We have had extensive discussions with the Department of Telecommunications (DoT), and agreed to vacate spectrum as per mutual agreement," the top official said.

The Ministry of Defence would adhere to the network gear procurement process in accordance with the 'trusted sources' framework.



Combat tanks, hit-tech systems, armed soldiers at DefExpo 2020

"The equipment procured through trusted sources needs to be considered," Kumar added. Recently, the National Cyber Security Coordinator (NCSC) has laid down the framework for trusted sources to overcome backdoor apprehensions.

Kumar said that the ministry is in the final process of creating a robust Network for Spectrum (NFS) infrastructure consisting of fibre-based cable deployed by Bharat Sanchar Nigam Limited (BSNL) for armed forces. "A major portion of the NFS project is complete and we expect full completion shortly," the official added.

In 2012, the defence and telecom ministries conceptualised the NFS program to connect critical defence locations having components such as optical-fibre backbone, satellite network, and network management systems.

<https://economictimes.indiatimes.com/news/defence/indian-armed-forces-to-build-5g-network-defence-secretary/articleshow/82100897.cms>



Sun, 18 April 2021

IAF Chief Rakesh Bhadauria to flag off 6 Rafale fighters from France on April 21

The six Rafale warplanes were earlier scheduled to fly to India on April 28 but the event was advanced by a week to coincide with IAF chief Rakesh Bhadauria's visit

By Shishir Gupta

Indian Air Force Chief Air Chief Marshal Rakesh Bhadauria will flag off six Rafale fighter jets from Merignac-Bordeaux airbase in south-western France on April 21, setting the stage for activating the second Rafale squadron at Hasimara in West Bengal, people familiar with the matter said.

The IAF chief is scheduled to visit France from April 20, and will be in the country till April 23. The six warplanes were earlier scheduled to fly to India on April 28 but the event was advanced by a week to coincide with his visit.

It is understood that during his France visit, Air Chief Bhadauria will visit a French Rafale squadron, meet his counterpart Phillippe Lavigne and visit the newly-established Space Command in Paris.

The arrival of the six Rafale jets flagged by IAF chief Rakesh Bhadauria will raise the number of the Omni-role fighters with the IAF to 20 of the 36 contracted Rafale jets to India. This will enable the air force to complete the 117 Golden Arrows Squadron in Ambala with 18 aircraft and start the second squadron with 2 fourth-generation-plus fighter jets.

"The six fighters will fly to Ambala airbase, from where the fighters will be repurposed for the formation of a second squadron at Hasimara," said a senior air force officer.

The formation of a second Rafale squadron at Hasimara will add teeth to India's aerial capability with Hercules C-130 J airlift squadron based in Panagarh in the northern part of West Bengal. Given the location of both the squadrons on the gates of Siliguri corridor, the IAF will have the power to counter any offensive from the north in the eastern sector, particularly in Sikkim and Arunachal Pradesh.



Indian Air Force's Rafale fighter jet lands during the first day of the Aero India 2021 Airshow at the Yelahanka Air Force Station in Bangalore on February 3, 2021.(AFP)

According to Dassault Aviation officials, another batch of four Rafale jets will fly to India in May. In addition to these 24 which will be with the IAF in India, the aviation giant has handed over seven more Rafale fighters that are used for training IAF officers in France. By May-end, only five more fighters are to be handed over by Dassault to complete the full package of 36 aircraft.

India and France inked the government-to-government deal for the 36 aircraft in 2016 that has also contributed to the two countries deepening bilateral ties including defence cooperation. Indian officials said the two countries have decided that future military hardware purchases would also be finalised on a government-to-government basis to keep out middlemen and lobbyists.

There is a huge potential to strengthen defence cooperation between India and France since Paris does not impose any condition to any military sales or joint development with India.

It is also in this context that Prime Minister Narendra Modi is expected to travel to France after wrapping up the India-European Union Summit in Portugal on May 7. French President Emmanuel Macron is expected to be in Portugal for the summit on May 7 and returns to Paris the next day.

To add to India's comfort, France is the only country with a well-developed military industry that has no defence dealings with Pakistan or China and has bilateral convergence in Indo-Pacific and space cooperation. Pakistan is completely reliant on Chinese military technology, which is based on Russian design and aircraft engines.

France's relations with Pakistan, which have been on a slide for more than a year, has hit a new low with Islamists groups like Tehreek-e-Labbaik Pakistan (TLP) seeking retribution for statements made by President Macron that they consider to be "blasphemy". There have been suggestions that the increasing belligerence of Islamists in Pakistan can force Paris to downgrade diplomatic ties with Islamabad. On Thursday, French diplomats in Islamabad confirmed to news channel Al Jazeera that it had asked French nationals and companies to temporarily leave Pakistan in view of the "serious threats to French interests" to leave Pakistan.

<https://www.hindustantimes.com/india-news/iaf-chief-rakesh-bhadauria-to-flag-off-6-rafale-fighters-from-france-on-april-21-101618642400474.html>

Business Standard

Sat, 17 April 2021

IAF to reorient for future challenges, prep roadmap for asset utilisation

The Indian Air Force (IAF) has decided to reorient itself for future challenges across all threat domains and prepare a roadmap for effective utilisation of assets and future inductions

New Delhi: The Indian Air Force (IAF) has decided to reorient itself for future challenges across all threat domains and prepare a roadmap for effective utilisation of assets and future inductions, officials said.

The force is also looking for innovative and low cost solutions for enhancing training effectiveness as well as adopting a scalable contingency response model.

The decision was taken during Indian Air Force Commanders' Conference 2021 that concluded on Friday.

During the Conference Commanders, the IAF said that the contours of the operational philosophy and organisational aspects of Air Defence and Joint Command Structures were also discussed.



Air Chief Marshal RKS Bhadauria climbed alone into the cockpit of a Tejas fighter on Wednesday, revved up its powerful turbofan engine and took off for a solo flight around Coimbatore. Photo: PTI

The IAF Commanders' Conference 2021, themed 'Reorienting for the Future' concluded at Air Headquarters on late Friday.

The three day conference saw detailed deliberations on ways and means to enhance the operational capabilities of the IAF.

Air Officers Commanding-in-Chief of the seven commands and key appointments from Air Headquarters attended the conference.

The conference was addressed by Defence Minister Rajnath Singh. The Chief of Defence Staff General Bipin Rawat and chief of two services - Army and Navy -- also addressed the conference and interacted with the commanders on subjects of future war-fighting through joint planning and integration of service capabilities.

The actions and follow-up plans for implementing the directions given by the Prime Minister Narendra Modi during the Combined Commanders' Conference were discussed by the participants.

The other key subjects included reorientation of the IAF for future challenges across all threat domains, and the roadmap for effective utilisation of assets and future inductions.

In his address to the Commanders, Air Force Chief Air Chief Marshal Rakesh Kumar Singh Bhadauria emphasised the need for incorporation of new technologies such as artificial intelligence and 5G, enhanced utilisation of cyber and space domains and continuous update of doctrines, tactics and procedures.

He stressed upon empowerment of junior leadership through comprehensive human resource reforms and increasing efficiency through organisational restructuring.

(Only the headline and picture of this report may have been reworked by the Business Standard staff; the rest of the content is auto-generated from a syndicated feed.)

https://www.business-standard.com/article/current-affairs/iaf-to-reorient-for-future-challenges-prep-roadmap-for-asset-utilisation-121041700133_1.html

**INDIA
TODAY**

Sun, 18 April 2021

India's nuclear sharks

A long-delayed project nears CCS clearance even as India's submarine force gets long in the tooth. Why the N-powered attack submarine project has taken so long

By Sandeep Unnithan

New Delhi: The PowerPoint presentation by navy chief Admiral Karambir Singh at the combined commanders' conference in Kevadia, Gujarat, on March 6 this year had been some months in the making. For nearly 18 months now, the proposal to indigenously build six nuclear-powered attack submarines (SSNs) for Rs 96,000 crore had been stuck with the Cabinet Committee on Security (CCS) as senior government officials questioned the need for the platforms during an economic crisis. The navy chief pressed Prime Minister Narendra Modi over the urgency of the programme to build the SSNs, each displacing around 6,000 tonnes and costing around Rs 16,000 crore, as key to solving the crisis in India's underseas combatant arm. The bulk of India's conventional submarine fleet, acquired in the 1980s, are approaching the end of their 30-year service lives. Bureaucratic delays have hit their replacements.

The underseas arm is shrinking at a time when India's principal adversary, China, has initiated the largest post-Cold War naval expansion. The



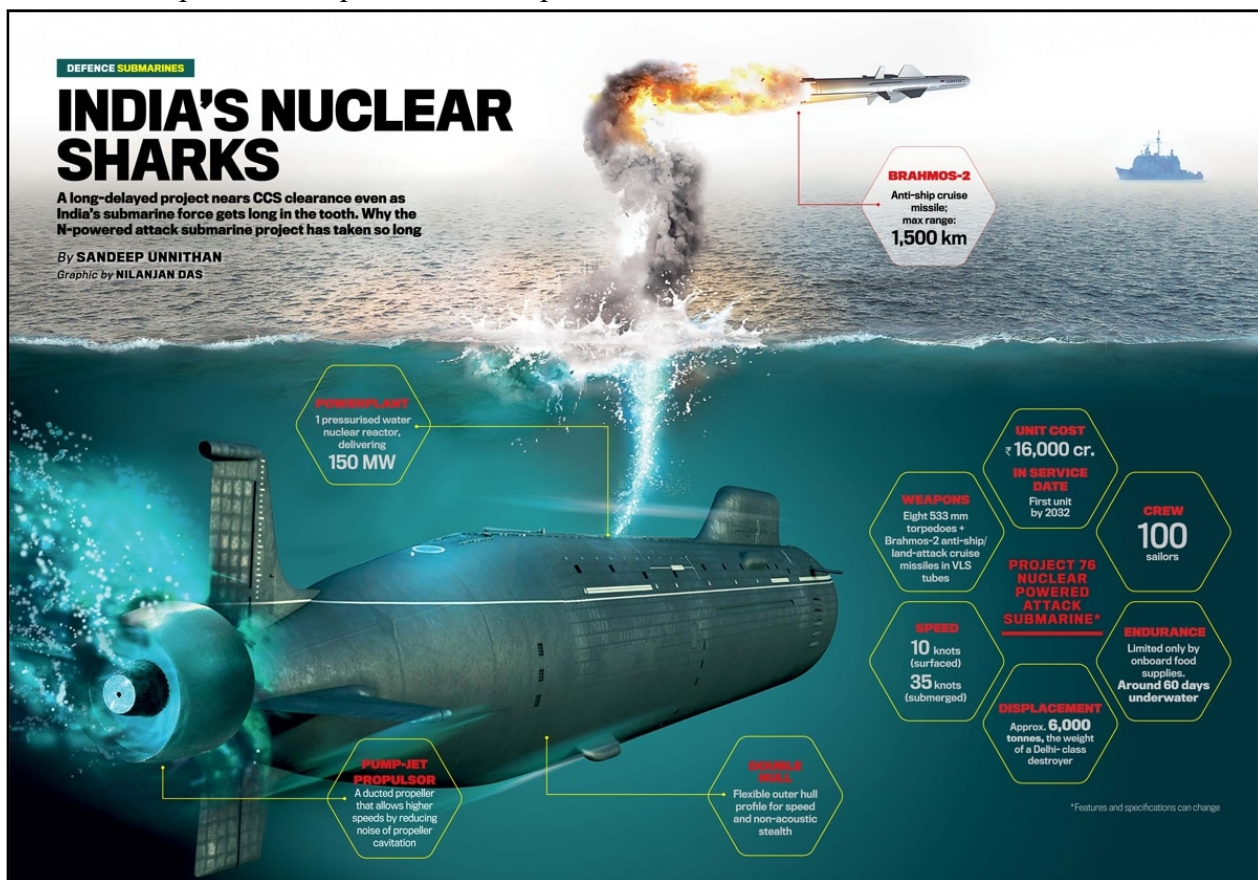
IN DEPTH, File pix of INS Chakra

PLA (People’s Liberation Army) navy is now the world’s largest in number of warships, and will continue to grow over the next decade, not only adding new aircraft carriers, nuclear submarines and surface ships but also expanding its reach through distant deployments in the Indian Ocean region.

Admiral Singh’s pitch seems to have worked. The CCS is now set to fire the starter’s pistol on a project that has been on the blocks for two decades. The CCS nod will release government funds so that the geographically scattered, technologically challenging project can finally get under way. The project involves a final design clearance in Gurugram, nuclear reactor construction in Kalpakkam, hull fabrication in Hazira and assembly and sea trials at the ship-building centre (SBC) in Visakhapatnam. It will take over a decade for the first 6,000-tonne submarine to enter the waters. It is believed that an ambitious naval project to build a second indigenous aircraft carrier, the 65,000-tonne IAC-2, has now been shelved in favour of the SSN project.

The SSN project has remained in the shadows of India’s Advanced Technology Vessel (ATV), a top secret effort to build four nuclear-powered ballistic missile submarines (SSBNs). The INS Arihant was commissioned in 2016 and the second unit, the S3, will be commissioned this year. Two more units, the S4 and the S4*, will be inducted by 2025.

Both SSBNs and SSNs use nuclear fission reactors to generate enormous heat generating steam to drive a propeller shaft. But that’s where their similarity ends. SSBNs are like strategic bombers, tools of deterrence stealthily lurking under the ocean with their ready-to-fire nuclear-tipped missiles. SSNs are the underwater equivalent of fighter jets. Conventional diesel-electric submarines are in reality submersibles, they have to ‘snorkel’ close to the surface of the water, to suck in air to run their diesel engines and recharge their batteries, when they are most vulnerable to detection. They can sustain submerged speeds of 20 knots in only short bursts of around half an hour. SSNs are true submarines in that they can stay and operate underwater almost indefinitely, their endurance is limited only by food supplies for the crew. They are also equipped with a range of tactical weapons like torpedoes, anti-ship cruise missiles and land-attack cruise missiles.



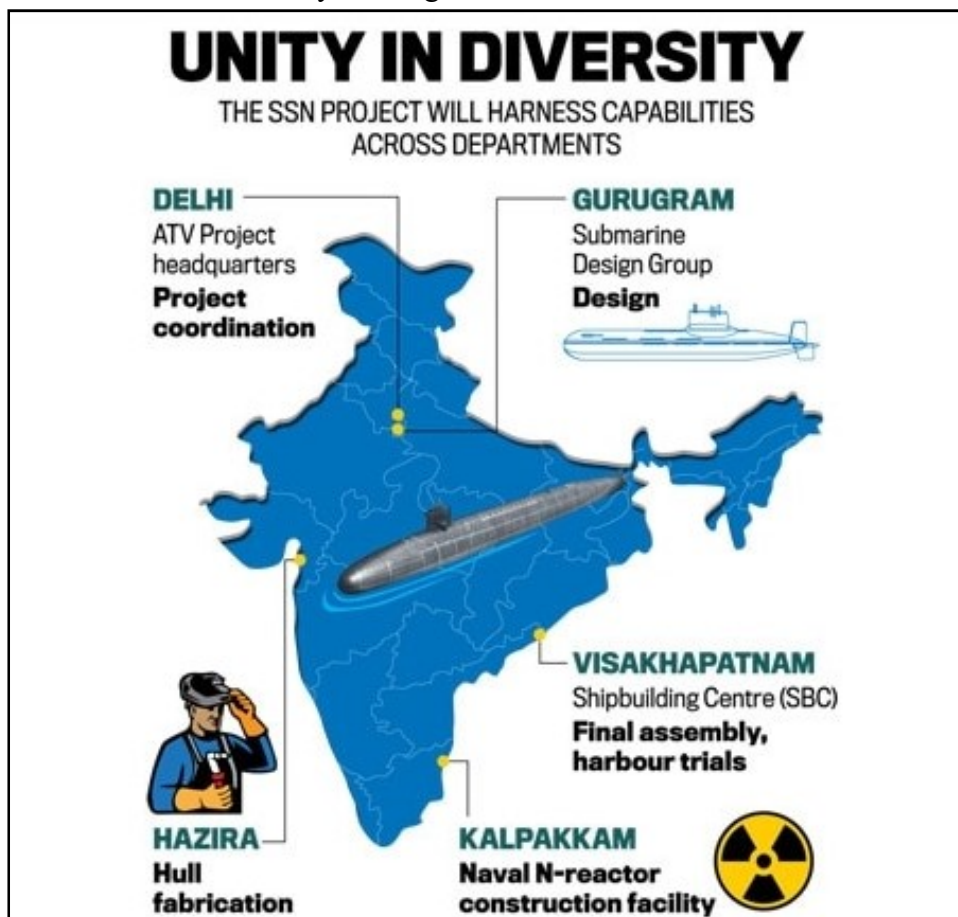
Since the 1990s, the Indian Navy has projected a requirement of at least six SSNs to patrol its sphere of influence in the Indian Ocean. It presently has only one, the Chakra-2 taken on a 10-year

lease from Russia in 2012. The Chakra-2 is only months away from being returned after the expiry of its agreement. It will be at least six years before its successor, the Chakra-3, joins the navy. This former Russian navy nuclear-powered submarine is being refitted in a Russian shipyard to Indian specifications in a \$3 billion (Rs 21,000 crore) agreement inked in March 2019.

There will be a four-year gap in the navy’s underwater capabilities before Chakra-3 arrives. But it won’t be the most egregious void. The navy is already staring at a ‘lost decade’ where it will acquire just three conventional submarines through the 2020s as against a requirement of at least a dozen such vessels. Only six of the projected 24 submarines under the navy’s 30-year submarine building plan proposed in 1997 will join as per plan. The Rs 45,000 crore Project 75I to indigenously build six large conventional submarines which can operate near the maritime chokepoints of the Indonesian islands, has been held up for 15 years. A bulk of the navy’s fleet of 15 conventional submarines are over 30 years old. A handful have been given deep refits in Russian shipyards to extend their service lives. A fleet of indigenous SSNs, which will begin to arrive in the next decade, will do little to resolve the current crisis.

India’s stop-start SSN quest

The Modi government’s thinking for submarines over aircraft carriers was shaped to a large extent by the committee of experts headed by Lt Gen. D.B. Shekatkar. The committee, which submitted its report to defence minister Manohar Parrikar in December 2016, explicitly struck down the proposal for a third aircraft carrier and pitched for more submarines. Parrikar shared this view as well. The late defence minister frequently argued that the only way India could counter a growing Chinese surface fleet was by fielding submarines that could hunt them.



Perhaps Parrikar knew what the American intelligence assessments had repeatedly flagged. The PLA navy was growing fast, but so was its Achilles’ heel, the lack of anti-submarine warfare capabilities. This vulnerability is best exploited by nuclear-powered attack submarines, what nuclear strategist Rear Admiral Raja Menon (retired) calls “the ultimate arbiter of sea power”. An SSN moves at speeds of over 30 nautical miles per hour underwater (55 kmph), the top speed of the navy’s most powerful surface combatant, a Delhi-class destroyer. Swiftly moving under the

ocean, it can stalk and strike at enemy warships and shore targets with its arsenal of deadly heavyweight torpedoes and long-range cruise missiles. They are the only platform that can operate independently and discreetly in enemy waters, thus posing an asymmetrical threat. Their lethality and near-invulnerability has even inspired a popular meme, ‘There are only two types of vessels at sea, submarines and targets.’ The technological complexity of fitting in a compact high-performance reactor inside a submarine hull has restricted this capability to only the five permanent members of the UN Security Council.

Unsurprisingly, their game-changing utility has been grasped by politicians with great power dreams. Even those with a perceived landward bias. Mao Zedong, who had once operated out of mountain caves as a guerrilla, said in 1959 that China would produce nuclear submarines even if it took “10,000 years”. The first Chinese SSN entered service in 1974 and was named ‘Long March-1’ after the definitive event in the chairman’s life. It was noisy and leached radioactivity but propelled China as the last entrant into an elite club.

The event did not go unnoticed by Indian planners, nervous at the prospect of nuclear weapons wielded by its unpredictable northern neighbour with whom it had already fought a border war in 1962. The government’s Apex Committee-1, headed by career diplomat D.P. Dhar, which drafted the Indian Defence Plan between 1974 and 1979 noted that “the only arm of China’s navy that can be used against us is her submarine arm”. Yet, by then, the Indian state had already set its sights on SSBNs. In 1968, then prime minister Indira Gandhi’s principal secretary P.N. Haksar had already outlined the need for “submarines driven by nuclear power fitted out to carry nuclear missiles” as a deterrent against China. The ATV project yielded a modest seaborne nuclear deterrent only a half-century later, in 2018, when the INS Arihant sailed out on its first deterrent patrol.

Defence analysts say India’s future SSN fleet would provide several operational advantages that submarines in general, and SSNs in particular, bring to seapower. “Submarines missing from home harbours, whether SSK, SSN or SSBN, leverage what I call oxymoronic ‘covert presence’ worries as did happen to Pakistan during the Kargil conflict,” says naval analyst Rear Admiral Sudarshan Shrikhande (retired). “They may operate at slower speeds in patrol areas, but deployment and relocation speeds create more options. Armed with land attack and long-range anti-ship missiles and near-constant communication linkages, they are important parts of sea control, power projection and, of course, even more lethal sea denial, depending on strategic and operational contexts.”

Former project officials say the SSN plan has been on the slow burner for over two decades, mainly over its prohibitive cost. Unlike the strategic ATV SSBNs paid for by the central government through separate budgetary heads, SSNs will be paid for by the navy. The navy accounts for the smallest share of the defence budget, just 14 per cent, so will have to rationalise its spend in buying new warships, aircraft and submarines.

Budgetary worries and the naval brass’s bias for aircraft carriers probably explains why Project 76 has struggled to take off since it was given an in-principle approval by the government in 1998. In 2006, when a committee headed by then principal scientific advisor to the PM, R. Chidambaram, identified the technology that would be needed to develop a new generation of nuclear submarines, three new ‘S-5’ SSBNs displacing around 13,500 tonnes. Both designs would be powered by a new indigenously designed nuclear reactor designed by BARC (Bhabha Atomic Research Centre). This high performance reactor, believed to have an output of around 190 MW, would be a vast improvement over the Arihant class’ modest 83-MW reactor. In 2007, a naval HQ paper projected a formal need for six SSNs with the first unit to be fielded in 15 years (by 2022). The project, however, lay in cold storage with the navy prioritising aircraft carriers and surface ships over submarines.

Meanwhile, the PLA navy’s submarine threat had already become a reality. The first distant ocean patrol by a Chinese Shang-class SSN in December 2013 woke up naval planners to the PLA Navy operating in its backyard. This was one factor that spurred an in-principle government approval for an SSN design study in February 2015. In December 2016, then navy chief Admiral Sunil Lanba, the first government official to acknowledge the project, parsed his words. “It has

kicked off. It is a classified project. The process has started.” Five years later, Project 76 is still in its design stage. The navy’s Submarine Design Group (SDG), it is understood, is yet to finalise the design. It will take at least two more years for this to happen before work can begin on fabricating the hull for the submarine.

By 2030, China’s overall submarine force would have grown to 76 boats (8 SSBNs, 13 SSNs and 55 SSKs), as per a 2020 US Office of Naval Intelligence assessment project India’s delays have been budgetary and bureaucratic. The navy has tried to match a brown water budget with its blue water aspirations. More recently, it clashed with Chief of Defence Staff (CDS) Gen. Bipin Rawat who indicated the government’s preference for submarines over aircraft carriers.

In a December 2020 interview to india today, Gen. Rawat said that “anything which moves on the surface, even on land, and at sea will get picked up”. “Today, you’ve got fairly accurate systems to bring down anything on land or at sea. So aircraft carriers are going to be vulnerable. One might say they keep moving, but so does the (enemy)it has the capability to keep you under observation and target you based on where you are next,” he said. The government’s view seems to have now prevailed. The indigenous SSN will now have to overcome technological challenges; the nuclear scientists have to design a powerful new pressurised water reactor before the submarine design can be frozen and work begins on cutting its specially developed indigenous steel. It’s a long and painful process but the first steps have hopefully been taken.

<https://www.indiatoday.in/magazine/defence/story/20210426-india-s-nuclear-sharks-1791817-2021-04-17>



Sat, 17 April 2021

Ashok Leyland delivers light bulletproof vehicles to Indian Air Force

- *Ashok Leyland said that the light bulletproof vehicles have been developed under the transfer of technology (TOT) from Lockheed Martin to Ashok Leyland.*
- *The light bulletproof vehicles completely indigenised and developed in India.*

Ashok Leyland, which is the largest supplier of logistics vehicles to the Indian Army, has delivered the first batch of its light bulletproof vehicles to the Indian Air Force this week. The flagship company of the Hinduja Group issued a statement today, saying that these light bulletproof vehicles are the first of its kind.

Ashok Leyland has stated that these light bulletproof vehicles are an adopted version of Lockheed Martin’s Common Vehicle Next Generation (CVNG). These vehicles have been developed under TOT from Lockheed Martin to Ashok Leyland and are completely indigenised and developed in this country.

Vipin Sondhi, Managing Director and CEO at Ashok Leyland, said, "Supplying to the Armed Forces is a matter of pride for us. We are delighted to have the opportunity to be able to

use our expertise in mobility in service of our nation. This LBPV is another example of our team’s capability combined with a strong sense of understanding of what is required in arduous conditions. We are grateful to be a trusted partner of the Indian Armed Forces, and we look forward to more opportunities like this to contribute significantly towards the ‘Atmanirbhar Bharat’ initiative."



Ashok Leyland has delivered the first batch of light bulletproof vehicles to Indian Air Force.

Some of the key features that these light bulletproof vehicles have are high off-road mobility in terrain like mud, sand, rocks as well as shallow water. The vehicles can fit in a crew of maximum six people and have enough space to carry equipment for any mission.

Nitin Seth, Chief Operating Officer at Ashok Leyland, said, "Our mobility solutions range from 4x4 to 12x12 for Defence personnel and logistics, and they have proved to be reliable partners, across our armed forces. Our relationship with Lockheed Martin started in 2014 with their CVNG Program and under TOT transfer and we hope to develop many more products for India and export market on this platform."

Ashok Leyland says that these vehicles can offer combat capability to launch attacks as well as ensure that the crew is well protected in case of blasts. It also claims that the crew inside these light bulletproof vehicles can easily survive long distance off-road travel and yet be an effective force at the end of the trip.

<https://auto.hindustantimes.com/auto/news/ashok-leyland-delivers-light-bulletproof-vehicles-to-indian-air-force-41618567657775.html>



Sat, 17 April 2021

ट्रक बनाने वाली कंपनी ने Indian Air Force के लिए बनाया ये खास 'हथियार'...जानिए इसकी ताकत के बारे में...

अशोक लेलैंड जो कि हिंदुजा ग्रुप की एक फ्लैगशिप कंपनी है, उसकी तरफ से बताया गया है कि इस व्हीकल को लॉकहिड मार्टिन और कंपनी के बीच हुए ट्रांसफर ऑफ टेक्नोलॉजी (ToT) के तहत ही डेवलप किया गया है। कंपनी ने पूरी तरह से इसे भारत में ही डेवलप किया है।

By ऋचा बाजपेई , Edited By अंकित त्यागी

अब आतंकी कोई भी बड़ा हमला करने में सफल नहीं हो पाएंगे।

ट्रक बनाने वाली कंपनी अशोक लेलैंड ने शुक्रवार को भारतीय वायुसेना (आईएएफ) को हल्के बुलेटप्रूफ व्हीकल्स सौंपे हैं। यह व्हीकल्स अमेरिकी फाइटर जेट बनाने वाली कंपनी लॉकहीड मार्टिन के साथ मिलकर तैयार किए गए हैं। इन मॉडर्न व्हीकल्स को 13 अप्रैल को डिलीवर किया गया है। इन लाइट बुलेट प्रूफ व्हीकल्स (एलबीपीवी) को लॉकहीड मार्टिन के कॉमन व्हीकल नेक्स्ट जेन (सीवीएनजी) को ध्यान में रखते हुए ही तैयार किया गया है।

हर तरह के सूत्र पर कर सकेगा मूव

अशोक लेलैंड जो कि हिंदुजा ग्रुप की एक फ्लैगशिप कंपनी है, उसकी तरफ से बताया गया है कि इस व्हीकल को लॉकहिड मार्टिन और कंपनी के बीच हुए ट्रांसफर ऑफ टेक्नोलॉजी (ToT) के तहत ही डेवलप किया गया है। कंपनी ने पूरी तरह से इसे भारत में ही डेवलप किया है।

एलबीवीपी, कीचड़, रेत, पहाड़ और छिछले पानी में भी आसानी से मूव कर सकते हैं। इसके अलावा इसकी वजह से सेना की युद्धक क्षमताओं में इजाफा होगा।



इसमें मौजूद क्रू भी हर प्रकार के बैलेस्टिक और बम धमाकों के खतरे से पूरी तरह से सुरक्षित रहेगा। अशोक लेलैंड ने वायुसेना को इस व्हीकल की डिलीवर अपने लिए एक गौरवशाली पल के तौर पर करार दी है।

अमेरिकी कंपनी के साथ हुआ तैयार

अशोक लेलैंड के मैनेजिंग डायरेक्टर और सीईओ विपिन सोदी ने कहा कि जवानों और सैन्य साजो-सामान के लिए कंपनी 4×4 से लेकर 12×12 तक के व्हीकल्स तैयार कर सकती है।

उन्होंने जानकारी दी कि लॉकहीड मार्टिन के साथ उनकी साझेदारी साल 2014 में शुरू हुई थी जब अमेरिकी कंपनी ने अपना सीवीएनजी प्रोग्राम शुरू किया था। टीओटी के तहत कंपनी को उम्मीद है आने वाले समय में कई और प्रोडक्ट्स तैयार होंगे और उन्हें निर्यात भी किया जा सकेगा।

आतंकियों को पकड़ने में होगी आसानी

जो व्हीकल कंपनी ने तैयार किया है बताया जा रहा है कि उसका प्रयोग पैरामिलिट्री फोर्सज नक्सली इलाकों जैसे छत्तीसगढ़, झारखंड के साथ ही आतंकवाद से प्रभावित जम्मू-कश्मीर में भी कर सकेंगे। इससे अर्धसैनिक बलों को सुरक्षा मिलेगी और वे दुश्मनों का सामना बिना जोखिम के कर सकेंगे।

आईएएफ ने एयरबेस की सुरक्षा के लिए 6 टन वाले बुलेट प्रूफ व्हीकल्स को खरीदा है। ये व्हीकल्स जहां किसी भी तरह के बम हमलों से सुरक्षित रहते हैं तो वहीं आईएएफ के गरुड़ कमांडो टीम के छह सदस्य इसमें समा सकते हैं। माना जा रहा है कि इसकी मदद से आतंकी पठानकोट जैसा आतंकी हमला नहीं दोहरा पाएंगे।

<https://www.tv9hindi.com/knowledge/ashok-leyland-delivers-first-bulletproof-vehicles-to-indian-air-force-619981.html>



Sat, 17 April 2021

India to get world's best Air Defence System S-400 from Russia; Check details

In view of the standoff between the Indian and Chinese armies, along the Line of Actual Control (LAC), India had requested Russia to expedite the delivery of S-400 air defence system. Technically it was not possible

By Huma Siddiqui

Later this year, Russia is going to deliver the first regimental set of S-400 Triumph 'SA-21 Growler' air defence systems. Sources have confirmed to Financial Express Online, "Though specific month or date has been confirmed yet, the Russian side is going to deliver the first set later this year."

Financial Express Online had reported earlier quoting Russian officials about the delivery of the first set, in later 2021. In view of the standoff between the Indian and Chinese armies, along the Line of Actual Control (LAC), India had requested Russia to expedite the delivery of S-400 air defence system. Technically it was not possible.

Why?

Because technically there are different stages including the technology-related stages of production, acceptance and transfer of equipment.

What is India expected to get?

Both countries have inked a \$ 5.43 billion contract. This contract is for the S-400 Triumph ‘SA-21Growler’, which is long-range surface-to-air missile (SAM) systems. This system is for the Indian Air Force (IAF) and will help in further enhancing the air defence (AD). And India will get five Triumph regimental kits from Russia.

The delivery is expected to be staggered and is expected to be completed ahead of 2025.

These kits, according to sources in the IAF are expected to be deployed along the Mumbai-Baroda Industrial Corridor and also in the National Capital Region (NCR).

A team from the IAF is already in Moscow undergoing training for operating the system when it arrives.

This system has the capability to detect and destroy high and low targets, and also form an impenetrable grid of missiles. This system which has four different types of missiles with ranges between 40 km, 100 km, 200-km and 400 km can be can also be deployed in a very short time.

With 92N6E electronically-steered phased array radar, it is resistant to electronic jamming.

Mode of payment

During a press interaction in New Delhi, 2019, the Russian officials had made it clear that the mode of payment has been formalized. Though not many details were shared with the media, it was hinted that the payment will not be dependent of USD. It was also hinted that the payment could be in Rupee-Rouble currency. And this will be through India’s main bank to the state-owned Russian Sberbank.

China, according to the Russian News Agency TASS, last year received the second batch of S-400 Triumph (NATO code name SA-21 Growler) through the sea route transportation.

The Trump administration in 2017 introduced the Countering America’s Adversaries Through Sanctions Act or CAATSA, however, India’s consistent stand has been that the process had started much before CAATSA was imposed by the US. And has always maintained that it is not a UN law.

Media Interaction

During a recent media interaction in New Delhi, external affairs minister S Jaishankar had said in response to a question that the S-400 will be discussed later this year when the defence ministers of both the countries will meet.

In a media interaction earlier this week, Russian ambassador Nikolay Kudashev said, “Both Russia and India are committed to adhering to timelines and other obligations under the S-400 missile deal.”

Responding to questions related to the possible US sanctions against New Delhi over the procurement of the weapons systems, the envoy termed the bilateral sanctions as “illegal tools” and “unfair unlawful”. Sanctions have already been imposed on Turkey by the US under the Countering America’s Adversaries Through Sanctions Act (CAATSA) for purchase of S-400 missile systems from Russia.

Since both India and China will have the same system what does it mean? Expert View

Milind Kulshreshtha, Strategic Analyst and C4I expert, says “The S-400 SAMs are mainly designed to destroy aerial threats, like aircrafts, UAVs as well as ballistic and cruise missiles. They are developed to give Point Defence and Area Defence anti-air capabilities with flexible ranges from 40km to 400Km (as per the model of S-400 in use) and targets flying at up to 30km altitude.



A team from the IAF is already in Moscow undergoing training for operating the system when it arrives.

“Tactically seen, these SAMs not only provide the much needed replacement for the Air Defence SAM complexes which are already in service, but can also effectively target any military aircraft which might take off from Pakistan airbase (or flying within Pakistani airspace) from a SAM launcher within Indian side,” he explains to Financial Express Online.

Sino-India Border S-400 SAM Deployment

“While India and China are negotiating a complex disengagement process to pull back men and weapons from the eastern Ladakh sector, it has been reported that the air forces of both countries are still actively deployed. Though highly unlikely any time soon, but as and when the border dispute on the ill-defined 3,440km long border escalates, IAF shall be playing a crucial role in the offensive effort by India as the land has an inhospitable Himalayan terrain. But, in this region, IAF fighter jets too face the same threat as the defensive advantage India gains with its own S-400 SAMs. China too uses the similar set of S-400 SAMs on their side of the border,” observes the C4I expert.

The S-400 SAM complexes are truck deployable also and this mobility makes its detection for tracking (to shoot) difficult. According to him, “The creation of road infrastructure by BRO shall be effectively providing mobility to S-400 SAM mounted heavy trucks on the Indian side. Overall, S-400 SAMs shall provide India with an offensive and a defensive capability. But, knowledge of exploitation of S-400s shall additionally provide IAF with tactics to under pin enemy SAM complexes or to outsmart such incoming SAM missiles. Availability of S-400 SAM complexes can help IAF to enact the ‘cat and mouse’ game to devise suitable air tactics to gain air superiority over these SAMs.”

<https://www.financialexpress.com/defence/india-to-get-worlds-best-air-defence-system-s-400-from-russia-check-details/2234332/>

THE TIMES OF INDIA

Sun, 18 April 2021

Dragon intensifies its efforts to acquire technologically advanced military hardware via Pakistan

By SD Pradhan

Dragon has speeded up the process of acquisition of high-end military hardware for reverse engineering and remove its noisy submarine engines for possible operations against the US via Bashi channel. Such acquisitions are being made via Pakistan- its long-time partner in nuclear proliferation activities and other such clandestine activities. Over the years, Pak Establishment’s subservient policies stemming from its economic needs and its perceived threat from India have turned it into a satellite state of China.

Turkey’s involvement in shady deals has also become palpable.

The increasing Pak defence budget during the last few years raises the question of its resources especially when the Pak economic situation is fast deteriorating. Defence allocation is around 18.43% [\$7.8 bn] of the budget for 2020-2021. However, this does not present the true picture. According to Ayesha Siddiqa, an expert on Pak military affairs, if major acquisitions by the Pak armed forces, spending on the public sector development programme (PSDP), expenditure on the nuclear programme and para-military forces, payments for military pensions, a newly set-up national security division and a few other military expenditures are added the figure would go much higher around \$ 11 bn.

The Pak Defence budget has been constantly been rising from 2013 when was 15.9% to now 18.43%. The defence budget for the year 2020-2021 represents about 12% increase over the previous year. Such a rise in defence allocation when the Pak government is unable to provide the

basic necessities of life to its citizens appears incongruous. The allocation for health (\$151 mn) and education (\$545 mn) are hugely insufficient. The much-needed subsidies have been reduced by 48%. Tax on petroleum has been enhanced by a whopping 73% not only adding to the woes of common-men but significantly raising the inflation rate. Despite this, the tax revenue has gone down by 30%.

Its foreign exchange is barely sufficient for two months. Its GDP growth is continuously going down from 5.5% in 2017-18 to (-)1.5% in the pandemic period. Its external debt even before the pandemic had risen to \$112 bn. About 47% of the Pak budget goes into servicing debt.

Under these circumstances, Pakistan's emphasis on the acquisition of technologically advanced weaponry appears strange. Its only perceived adversary is India, whose defence budget is continuously decreasing from 17.08% in 2016-17 to about 13.73% for year 2020-21. Significantly the Indian defence budget includes miscellaneous expenses and pensions. Hence, there is no justification on this ground.

Pakistan is getting from China major defence weapons. Its missiles and other weapons are from China which is providing these items for its strategic interests. What is noticeable is the Pak efforts to acquire technologically advanced weaponry from other countries for which it has no financial capability. There are credible indicators that China and Pakistan are involved in dubious deals for such purchases from other countries, which China cannot directly purchase. Obviously, the Chinese objective is to acquire such weapons/equipment for reverse engineering and produce similar weapons indigenously and replace its outdated military hardware.

Crucially, Pakistan maintains links with shady and proscribed organisations to make payment for such procurements. While the money comes from China, it is manoeuvred in such a way that involvement of China remains unnoticed.

The Pak Navy bought a passenger aircraft from Brazil through a third-party deal and then got it modified in a European country. While this may be used by Pakistan but its technology would be shared with China which may use that for producing similar aircraft. Pak-China are jointly producing J-17 with the Russian engine RD-93. Pakistan is also trying to get German engine for its Chinese submarines, which are noisy. China itself was concerned about it as it finds the noise of submarines reveal their positions. Pakistan is also procuring Italian torpedoes to replace the Chinese torpedoes and low-level search radars from Italy.

An article by a defence analyst B K Singh has indicated two instances to prove the Chinese effort to acquire technological information via Pakistan. First, the soft loan of \$5 bn, which was being given by China for the purchase of four Type 054A and eight submarines, could have contained the hidden amount for the Pak acquisitions.

Second, a recent satellite-based photograph revealed that Pak Agosta 90B submarine which was acquired from France was berthed between the two Chinese ships and importantly that was not the usual berthing place for 90B submarine.

This information needs to be seen in the backdrop of Pak contract of 2016 to upgrade its two 90B submarines by a Turkish firm STM despite "sanctions and restrictions" imposed by France whose Naval Group was the submarine's manufacturer. The contract included torpedo countermeasure systems and acoustic measurement sensors, is aimed at giving new capabilities to Pakistani submarines. Within the scope of modernization activities undertaken by the STM, the entire sonar suite of the submarine ship, periscope systems, and command and control system, as well as the radar and electronic support systems, are being replaced by Turkish military software. This was completed in two of its submarines by the mid-2020. It appears that its technology was being shared by the China, which is highly concerned about the noisy engines of its submarines.

Dragon's illicit acquisition of advanced technology, whether military, civilian, or dual-use, has been a cornerstone of its effort to "catch up" to the West technology for decades. Since the 1970s, the PRC has developed a reputation as an aggressive gatherer of export-restricted defence products, sensitive commercial technologies, and foreign military intelligence. This effort has only

accelerated in the last three decades. The US considers China as the single greatest risk to the US technology.

China's efforts to acquire advanced technology illicitly can generally be divided into two broad categories. The first consists of espionage, both in its traditional form, where intelligence and military organs clandestinely steal national security secrets, and its industrial variant, where the aim is to acquire commercial secrets and the range of actors, has been broadened to include scientific and manufacturing entities. The second includes collusion with other countries which can acquire such hardware even by violating rules and share clandestinely with China.

The Cox Report in US, had pointed out how the Chinese Ministry of State Security stole nuclear related technology from the US that included seven most advanced thermonuclear weapons, designs for small warheads. Integration of MIRV technology. These included the W-88 Trident D-5 warhead, W-56 Minuteman II, W-62 Minuteman III, W-70 Lance, W-76 Trident C-4, W-78 Minuteman III Mark 12A, and the W-87 Peacekeeper.

Beijing is now increasingly using Pakistan to acquire technologically advanced equipment and weapons for reverse engineering. Pakistan was reported to have provided with China unexploded Tomhawk cruise missiles. It also covertly shared US F-16 aircraft with China which harvested its technology for J-10 fighter aircraft.

In February 2020, a ship going to Karachi and carrying autoclave, which can be used in the launch process of ballistic missiles, was detained. The autoclave was declared as the industrial dryer to hide its identity. The final destination was suspected to be Turkey to assist it in its quest for nuclear weapons. It is strongly suspected that Turkey could be possessing a number of centrifuges, with the assistance from Pakistan and supported by China.

Thus, Beijing's lavish military assistance has a sinister dimension, besides assisting Pakistan to build its capacity to contain India and help in the export of Chinese weapons: this is to acquire technologically advanced hardware to match US to deter US in the South China Sea. Dragon's efforts to steal high-end technology with the help of Pakistan deserves a serious attention of the comity of nations to alert their entities against such deceptive activities.

(SD Pradhan has served as Chairman of India's Joint Intelligence Committee. He has also been the country's deputy national security adviser. He was Chairman of the Task Force on Intelligence Mechanism (2008-2010), which was constituted to review the functioning of the intelligence agencies)

<https://timesofindia.indiatimes.com/blogs/ChanakyaCode/dragon-intensifies-its-efforts-to-acquire-technologically-advanced-military-hardware-via-pakistan/>



Sat, 17 April 2021

China added cutting-edge carrier-killer missiles to this warship

If the YJ-12 proves satisfactory on China's destroyer ships, then its navy may have found a cost-efficient way to upgrade the anti-ship firepower of its older frigates and destroyers

By Sebastien Roblin

On May 1, 2020, pictures released on social media revealed a curious modification to the *Shenzhen*, the only Type 051B destroyer built by China. The largest warship in the People's Liberation Army Navy when she was commissioned in 1999, the 6,700-ton steam-powered destroyer was long ago overtaken by more modern designs.

The photos released in May showed boxy containers installed in a row amidship. Based on the design of the containers, it was clear the venerable destroyer now was packing YJ-12 supersonic

cruise missiles, a type once described as “the most dangerous anti-ship missile China has produced thus far.”

However, *Shenzhen* and the ex-Russian *Sovremenny*-class destroyer *Hangzhou*, which mounts only eight YJ-12s, are the only PLA warships currently known to be outfitted with the missile, which is primarily deployed on JH-7 and H-6 maritime strike bombers.

Steam-Powered Guided Missile Destroyer

The *Shenzhen* is a product of the 1990s, an era when the PLA Navy commissioned small runs of experimental ship designs in rapid succession as it sought to narrow its sizable technological deficit with the navies of Japan, Russia and the United States.



Oddly, the Type 051B—also known as the *Luhai*-class—was a significantly enlarged evolution of two Type 052 *Luhu*-class destroyers which entered service in 1994. Benefitting from warmer relations between China and the Western world in the 1980s, the Type 052s made extensive use of foreign components. These components included LM2500 gas-turbine engines built by General Electric, U.S. and Italian sonars, and French radars, combat and fire control systems.

However, these systems did not integrate well together, and a U.S Navy delegation invited to inspect a Type 052 noticed that the ships retained the foreign-language labels and documentation. Besides, availability of Western components gradually dried up over the 1990s due to sanctions placed after the massacre of protestors near Tiananmen Square in June 1989.

The naval architects at the 701 Research Institute, therefore, sought to use more indigenously developed systems in the Type 051B. Most notably, this saw the destroyer use two steam turbines for propulsion because sufficiently powerful gas turbine engines weren't fully developed.

The 051B, which reportedly cost two billion renminbi (in 1995, equivalent to \$241 million), was also engineered for modular construction. She was also the first PLAN warships intentionally designed for stealth, with a sloped hull “cleaned” of protruding weapons and antenna to reduce radar cross-section, and devices on the funnels to reduce heat signature.

The Type 051B was laid down in the Dalian shipyards late in December 1995 and launched secretly in October 1997. When she was openly commissioned two years later as the *Shenzhen* (DD-167) she was then the largest surface warship in the PLA Navy at 153 meters long, with a complement of 230 officers and sailors.

Shenzhen's original primary armament was sixteen YJ-83 subsonic anti-ship missiles packed into four quadruple launchers. Propelled to 690 miles per hour by a turbojet engine, the sea-skimming YJ-83 has a range of 112 miles and remains widely deployed on PLAN warships and aircraft.

For air defense, the *Shenzhen* relied on two eight-shot HQ-7 short-range (five to seven miles) surface-to-air missile launchers based on the French Crotale missile system, and four old-school 37-millimeter twin-barrel anti-aircraft cannons. A two-barrel 100-millimeter deck gun and six anti-submarine torpedo tubes rounded out its armament, and the ship had hangar facilities for two H-9 or (later) Ka-28 anti-submarine helicopters.

It also boasted the PLA Navy's first command system for coordinating operations of a naval task force, reportedly with numerous consoles to interface with different types of air and naval forces and transmit and receive encrypted communications.

Flagship and Testbed

Like her predecessors, *Shenzhen* was considered a testbed for new technologies that might be incorporated into newer warships. But the PLA Navy wasn't satisfied with the Type 051B's lack of

area air defense capability, and furthermore reportedly identified five thousand flaws during constructions and early trials which had to be corrected at cost by the shipyard.

No additional Type 051Bs were built, and it's even rumored a second hull at an advanced stage of construction was abandoned and later built as a different class of ship.

Still, the *Shenzhen* served operationally as a flagship in the South Sea Fleet and was prominently deployed on long-distance naval diplomacy missions with port visits in Africa, Europe and the Indian sub-continent, as well as anti-piracy patrols off of Somalia.

The unique vessel received minor armament upgrades in 2004, and the PLAN considered but discarded a scheme to replace her steam propulsion with now-available indigenous gas turbines.

Finally, a 2015–2016 refit at Zhanjiang naval base replaced the *Shenzhen*'s outdated air defenses with weapons and sensors used in a modern Type 054 frigate. First, the anti-aircraft guns were replaced with two Type 1130 close-in weapons systems (CIWS). These eleven-barreled Gatling cannons, aided by radar and an automated electro-optical fire control system, can spew 180 30-millimeter shells per second to mow down incoming missiles.

Furthermore, the HQ-7 missile launchers were replaced by a vertical launch system loaded with thirty-two HHQ-16 surface-to-air missiles. Based on the Russian Buk system, the HHQ-16's Mach 3 radar-guided missiles could intercept targets up to twenty-five miles away and at high altitude.

Additionally, new Type 382 search and Type 364 fire control radars were installed, and the electronic warfare, missile warning, combat and navigation systems, comms, and hydrophones all received updates.

Shenzhen and the YJ-12

The later 2020 refit with YJ-12 missiles, however, reinvented the *Shenzhen* into a particularly formidable anti-ship platform. The YJ-12, which appears to be an enlarged Russian Kh-31 missile air-to-surface missile, can surge to up two to four times the speed of sound and strike targets up to 250 miles away. It initially closes on the general position of a target using a combination of inertial and Beidou satellite navigation, then switches to active radar to home in for the kill.

Mostly used as an air-launched weapon, the YJ-12A model used by the *Shenzhen* includes rocket boosters that propel the 6.3-meter-long missile into the air.

The YJ-12's extreme speeds and ability to perform evasive maneuvers targeted ships very brief windows of opportunity to detect and shoot them down—and it would take only one or two hits to disable or destroy a warship. Thus the *Shenzhen*'s ability to salvo-fire sixteen of the 2.75-ton missiles is formidable indeed.

However, China's new mainstay Type 52D destroyers and Type 055 cruisers use a different weapon: the YJ-18 supersonic missile based on the Russian Kalibr/Klub missile. The YJ-18 can fit in vertical launch cells, unlike the YJ-12, and has a longer range of 335 miles. However, its warhead is roughly half the size and it may be slower in the cruise phase of flight.

The *Shenzhen*'s recent conversion could therefore spring from a desire to operationally test the advantages and downsides of the ship-launched YJ-12. Alternatively, installing deck-based container launchers may simply have been more viable in terms of cost and engineering than carving into the hull to install the multi-purpose vertical-launch systems used with the YJ-18.

If the YJ-12 proves satisfactory on the *Shenzhen* and *Hangzhou*, then the PLAN may have found a cost-efficient way to upgrade the anti-ship firepower of its older frigates and destroyers. That's not bad for a ship type that had production discontinued as soon as it entered service.

<https://nationalinterest.org/blog/buzz/china-added-cutting-edge-carrier-killer-missiles-warship-182959>

Generation of super-resolved optical needle and multifocal array using graphene oxide metalenses

In a new publication from *Opto-Electronic Advances*, researchers led by Professor Baohua Jia at Swinburne University of Technology, Victoria, Australia, Professor Cheng-Wei Qiu at National University of Singapore, Singapore and Professor Tian Lan at Beijing Institute of Technology, Beijing, China considered the generation of super-resolved optical needle and multifocal array using graphene oxide metalenses.

Ultrathin and lightweight, metalenses are becoming increasingly significant for their use in photonic chips, biosensors and micro imaging systems such as smart phone cameras.

Compared to conventional lenses, metalenses can improve the image quality of current cameras, by enhancing resolution and removing spherical and chromatic aberrations. A single ultrathin (less than the thickness of 1/100 of a human hair) metalens element can be used instead of the multiple element imaging systems required by conventional lenses. Due to the unique light-matter interaction in a confined 2D plane, 2D materials are ideal for use with metalenses, further reducing the required thickness of the lens. 2D Graphene family materials, for example graphene oxides, are air-stable, have many applications and are low-cost and easy to fabricate in large scale. They remain stable in extreme environments, for example lower earth orbit in aerospace, so have potential use in satellites replacing the current bulky lenses and improving imaging quality and lowering launch costs.

The authors of this article developed 200-nm-thick graphene oxide metalenses to generate specialized focal intensity distributions. The graphene oxide

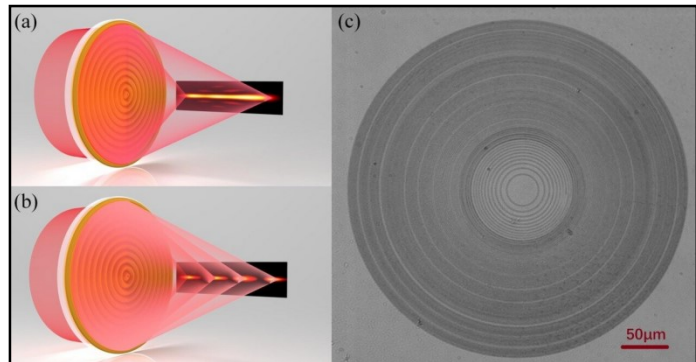


Fig. 1 Demonstration of GO metalenses and its characterization. (a) Optical demonstration for optical needle generated by GO metalens. (b) Optical demonstration for four axial focal spots generated by GO metalens. (c) Optical image of GO metalens taken by an optical microscope with an objective of $\times 20$, $NA=0.5$, the scale bar is $50\ \mu\text{m}$. Credit: *Opto-Electronic Advances* (2021). DOI: 10.29026/oea.2021.200031

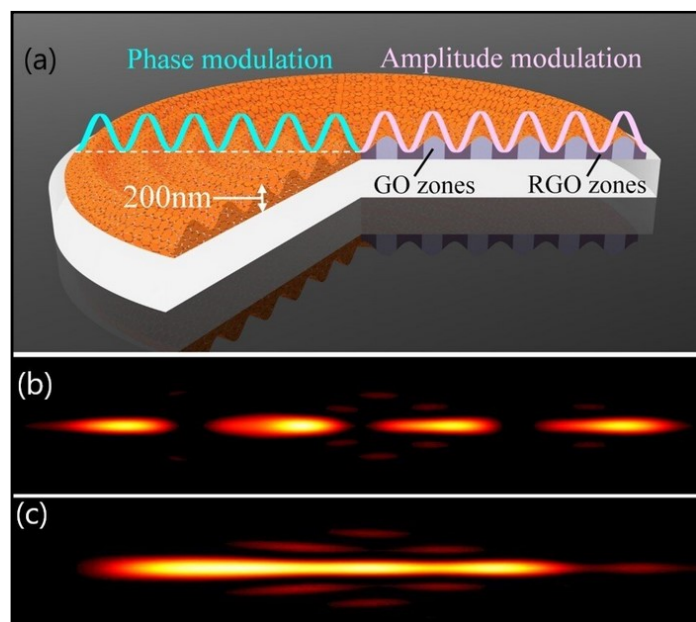


Fig. 2 (a) Schematic figure of GO metalens on a glass substrate, the total thickness is 200 nm. When reduced by femtosecond laser in RGO area, the absorption and refractive index increase while the thickness is reduced to 100 nm. Normalized intensity distribution in the x - z plane from theoretical calculation of the focusing characterization of (b) axial multifocal spots GO metalens and (c) optical needle GO metalens, respectively. Credit: *Opto-Electronic Advances* (2021). DOI: 10.29026/oea.2021.200031

metalenses have the capability of controlling light amplitude (i.e., transparency of the lens) and phase (refractive index and thickness of the lens) simultaneously. This differs from other metalenses, which introduce the modulations through multi-step nanofabrication or multilevel of nano-elements, the modulations of graphene oxide lenses are locally introduced by the laser photo-reduction process, which converts graphene oxide to graphene material. During the reduction process, the material becomes thinner and has a higher refractive index and absorption. Based on the simultaneous phase and amplitude modulations, the authors demonstrate precise control of the focal intensity distributions by creating a super-resolved ultra-long optical needle and an axial multifocal array, which are extremely challenging for other metalenses.

Graphene oxide metalenses will find broad applications in integrated photonics and compact photonic systems, including microscopic imaging, optical manipulation and photonic chips, and can be integrated on microfluidic chips to form lab-on-a-chip biophotonic devices. This research forms a basis for the development of graphene-based ultrathin integratable photonic devices and paves the way for broader applications, such as replacing current cell phone camera lens potentially allowing a reduction in the thickness of current cell phones.

More information: Hongtao Wang et al. Generation of super-resolved optical needle and multifocal array using graphene oxide metalenses, *Opto-Electronic Advances* (2021). DOI: [10.29026/oea.2021.200031](https://doi.org/10.29026/oea.2021.200031) <https://phys.org/news/2021-04-super-resolved-optical-needle-multifocal-array.html>



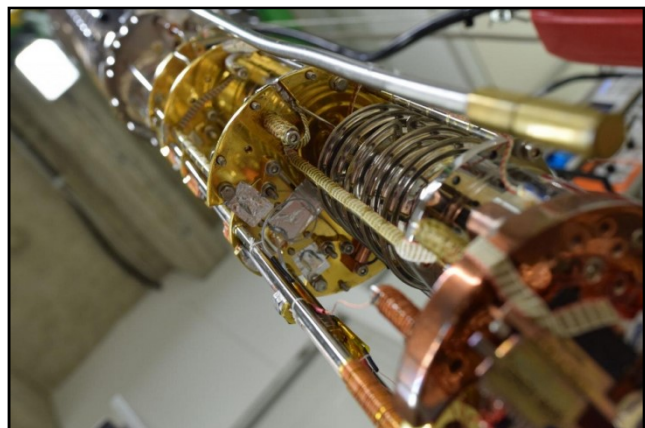
Sat, 17 April 2021

Experiments cast doubts on the existence of quantum spin liquids

A quantum spin liquid is a state of matter in which interacting quantum spins do not align even at lowest temperatures, but remain disordered. Research on this state has been going on for almost 50 years, but whether it really exists has never been proven beyond doubt. An international team led by physicist Prof. Martin Dressel at the University of Stuttgart has now put an end to the dream of a quantum spin liquid for the time being. Nevertheless, the matter remains exciting.

When temperatures drop below zero degrees Celsius, water turns to ice. But does everything actually freeze if you just cool it down enough? In the classical picture, matter inherently becomes solid at low temperatures. Quantum mechanics can, however, break this rule. Therefore, helium gas, for example, can become liquid at -270 degrees, but never solid under atmospheric pressure: There is no helium ice.

The same is true for the magnetic properties of materials: at sufficiently low temperatures, the magnetic moments known as 'spins', for example, arrange themselves in such a way that they are oriented opposite/antiparallel to their respective neighbors. One can think of this as arrows pointing alternating up and down along a chain or in a checkerboard pattern. It gets frustrating when the pattern is based on triangles: While two spins can align in opposite directions, the third is always parallel to one of them and not to the other—no matter how you turn it.

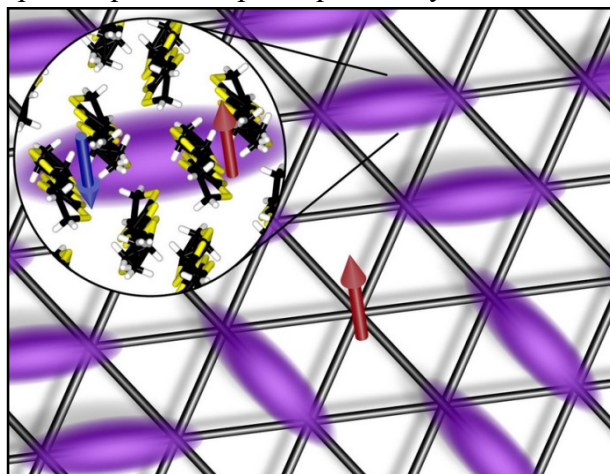


Using a ^3He - ^4He dilution refrigerator, microwave experiments can be performed at extremely low temperatures: a few hundredths of a degree above absolute zero. Credit: University of Stuttgart, Constantin Dressel

For this problem, quantum mechanics suggests the solution that the orientation and bond of two spins are not rigid, but the spins fluctuate. The state formed is called a quantum spin liquid in which the spins constitute a quantum mechanically entangled ensemble. This idea was proposed almost fifty years ago by the American Nobel laureate Phil W. Anderson (1923-2020). After decades of research, only a handful of real materials remain in the search for this exotic state of matter. As a particularly promising 'candidate' a triangular lattice in a complex organic compound was considered, in which no magnetic order with a regular up-down pattern could be observed, even at extremely low temperatures. Was this the proof that quantum spin liquids really exist?

One problem is that it is extremely challenging to measure electron spins down to such extremely low temperatures, especially along different crystal directions and in variable magnetic fields. All previous experiments have been able to probe quantum spin liquids only more or less indirectly, and their interpretation is based on certain assumptions and models. Therefore, a new method of broadband electron spin resonance spectroscopy has been developed over many years at the Institute of Physics 1 at the University of Stuttgart.

Using on-chip microwave lines, one can directly observe the properties of the spins down to a few hundredths of a degree above absolute zero. In doing so, the researchers found that the magnetic moments do not arrange themselves in the up-down pattern of a typical magnet, nor do they form a dynamic state resembling a liquid. "In fact, we observed the spins in spatially separated pairs. Thus, our experiments have shattered the dream of a quantum spin liquid for now, at least for this compound," summarizes Prof. Martin Dressel, head of the Institute of Physics 1.



Arrangement of the spins in a triangular lattice: Two spins each form a pair, whereby their magnetic moments cancel each other out when viewed from the outside. Credit: University of Stuttgart, PI1

But even though the pairs did not fluctuate as hoped, this exotic ground state of matter has lost none of its fascination for the physicists. "We want to investigate whether quantum spin liquids might be detectable in other triangular lattice compounds or even in completely different systems such as honeycomb structures", Dressel outlines the next steps. However, it could also be that such a disordered, dynamic state simply does not exist in nature. Perhaps every kind of interaction leads in one way or another to a regular arrangement if the temperature is low enough. Spins just like to pair up.

More information: Björn Miksch et al, Gapped magnetic ground state in quantum spin liquid candidate κ -(BEDT-TTF) $_2$ Cu $_2$ (CN) $_3$, *Science* (2021). DOI: [10.1126/science.abc6363](https://doi.org/10.1126/science.abc6363)

Journal information: [Science](https://www.science.org)
<https://phys.org/news/2021-04-quantum-liquids.html>

New tech builds ultralow-loss integrated photonic circuits

Encoding information into light, and transmitting it through optical fibers lies at the core of optical communications. With an incredibly low loss of 0.2 dB/km, optical fibers made from silica have laid the foundations of today's global telecommunication networks and our information society.

Such ultralow optical loss is equally essential for integrated photonics, which enable the synthesis, processing and detection of optical signals using on-chip waveguides. Today, a number of innovative technologies are based on integrated photonics, including semiconductor lasers, modulators and photodetectors, and are used extensively in data centers, communications, sensing and computing.

Integrated photonic chips are usually made from silicon that is abundant and has good optical properties. But silicon can't perform every required function in integrated photonics, so new material platforms have emerged. One of these is silicon nitride (Si_3N_4), whose exceptionally low optical loss (orders of magnitude lower than that of silicon), has made it the material of choice for applications for which low loss is critical, such as narrow-linewidth lasers, photonic delay lines, and nonlinear photonics.

Now, scientists in the group of Professor Tobias J. Kippenberg at EPFL's School of Basic Sciences have developed a new technology for building silicon nitride integrated photonic circuits with record low optical losses and small footprints. The work is published in *Nature Communications*.

Combining nanofabrication and material science, the technology is based on the photonic Damascene process developed at EPFL. Using this process, the team made integrated circuits of optical losses of only 1 dB/m, a record value for any nonlinear integrated photonic material. Such low loss significantly reduces the power budget for building chip-scale optical frequency combs ("microcombs"), used in applications like coherent optical transceivers, low-noise microwave synthesizers, LiDAR, neuromorphic computing, and even optical atomic clocks. The team used the new technology to develop meter-long waveguides on 5x5 mm² chips and high-quality-factor microresonators. They also report high fabrication yield, which is essential for scaling up to industrial production.

"These chip devices have already been used for parametric optical amplifiers, narrow-linewidth lasers and chip-scale frequency combs," says Dr. Junqiu Liu who led the fabrication at EPFL's Center of MicroNanoTechnology (CMi). "We are also looking forward to seeing our technology being used for emerging applications such as coherent LiDAR, photonic neural networks, and quantum computing."

More information: J. Liu, G. Huang, R. N. Wang, J. He, A. S. Raja, T. Liu, N. J. Engelsen, and T. J. Kippenberg, "High-yield, wafer-scale fabrication of ultralow-loss, dispersion-engineered silicon nitride photonic circuits", *Nature Communications* 16 April 2021. DOI: [10.1038/s41467-021-21973-z](https://doi.org/10.1038/s41467-021-21973-z)

Journal information: [Nature Communications](#)

<https://phys.org/news/2021-04-tech-ultralow-loss-photonic-circuits.html>



Integrated silicon nitride photonic chips with meter-long spiral waveguides. Credit: Jijun He, Junqiu Liu (EPFL)

Trained dogs can sniff out Covid-19-positive samples with 96% accuracy: Research

The findings are feeding into another investigation that Otto and colleagues have dubbed "the T-shirt study," in which dogs are being trained to discriminate between the odours of Covid-positive, -negative, and -vaccinated individuals

A proof-of-concept investigation published today in the journal PLOS ONE suggests that specially trained detection dogs can sniff out Covid-19-positive samples with 96 per cent accuracy.

"This is not a simple thing we're asking the dogs to do," says Cynthia Otto, senior author on the work and director of the University of Pennsylvania School of Veterinary Medicine Working Dog Center. "Dogs have to be specific about detecting the odour of the infection, but they also have to generalize across the background odors of different people: men and women, adults and children, people of different ethnicities and geographies.

In this initial study, researchers found the dogs could do that, but training must proceed with great care and, ideally, with many samples. The findings are feeding into another investigation that Otto and colleagues have dubbed "the T-shirt study," in which dogs are being trained to discriminate between the odours of Covid-positive, -negative, and -vaccinated individuals based on the volatile organic compounds they leave on a T-shirt worn overnight.

"We are collecting many more samples in that study -- hundreds or more -- than we did in this first one, and are hopeful that will get the dogs closer to what they might encounter in a community setting," Otto says.

Through the Working Dog Center, she and colleagues have had years of experience training medical-detection dogs, including those that can identify ovarian cancer. When the pandemic arrived, they leveraged that expertise to design a coronavirus detection study.

Collaborators Ian Frank from the Perelman School of Medicine and Audrey Odom John from the Children's Hospital of Philadelphia provided SARS-CoV-2-positive samples from adult and pediatric patients, as well as samples from patients who had tested negative to serve as experimental controls. Otto worked closely with coronavirus expert Susan Weiss of Penn Medicine to process some of the samples in Penn's Biosafety Level 2+ laboratory to inactivate the virus so they would be safe for the dogs to sniff.

Because of workplace shutdowns due to the pandemic, instead of working with dogs at Penn Vet, the researchers partnered with Pat Nolan, a trainer with a facility in Maryland.

Eight Labrador retrievers and a Belgian Malinois that had not done medical detection work before were used in the study. First, the researchers trained them to recognize a distinctive scent, a synthetic substance known as a universal detection compound (UDC). They used a "scent wheel" in which each of 12 ports is loaded with a different sample and rewarded the dog when it responded to the port containing UDC.



Trainer Susanna Paavilainen directs sniffer dog Kossi in Helsinki Airport in Vantaa, Finland. (REUTERS)

When the dogs consistently responded to the UDC scent, the team began training them to respond to urine samples from SARS-CoV-2 positive patients and discern positive from negative samples. The negative samples were subjected to the same inactivation treatment -- either heat inactivation or detergent inactivation -- as the positive samples.

Processing the results with assistance from Penn criminologist and statistician Richard Berk, the team found that after three weeks of training all nine dogs were able to readily identify SARS-CoV-2 positive samples, with 96% accuracy on average. Their sensitivity, or ability to avoid false negatives, however, was lower, in part, the researchers believe, because of the stringent criteria of the study: If the dogs walked by a port containing a positive sample even once without responding, that was labelled a "miss."

The researchers ran into many complicating factors in their study, such as the tendency of the dogs to discriminate between the actual patients, rather than between their SARS-CoV-2 infection status. The dogs were also thrown off by a sample from a patient that tested negative for SARS-CoV-2 but who had recently recovered from Covid-19.

"The dogs kept responding to that sample, and we kept telling them no," Otto says. "But obviously there was still something in the patient's sample that the dogs were keying in on."

Major lessons learned from the study, besides confirming that there is a SARS-CoV-2 odour that dogs can detect, were that future training should entail large numbers of diverse samples and that dogs should not be trained repeatedly on the samples from any single individual.

"That's something we can carry forward not only in our COVID training but in our cancer work and any other medical detection efforts we do," says Otto. "We want to make sure that we have all the steps in place to ensure quality, reproducibility, validity, and safety for when we operationalize our dogs and have them start screening in community settings."

Cynthia M. Otto is a professor of working dog sciences & sports medicine and director of the Working Dog Center in the University of Pennsylvania School of Veterinary Medicine.

<https://www.hindustantimes.com/science/trained-dogs-can-sniff-out-covid-19-positive-samples-with-96-accuracy-research-101618651044276.html>

